T05D01 HW: Thermochemistry II

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: ***Solve each of the following on a sheet of your own paper***. Show ALL work including UNITS. If specific heats for some of the elements are needed and not given consult your periodic table.

1. A piece of silver has a mass of 362 grams and a heat capacity of 85.7 J/degree C. What is the specific heat of silver? [Think of the units associated with specific heat, and an epiphany will hopefully occur.]
2. Calculate the heat liberated when 366 grams of mercury cools from 77.0 to 12.0 degrees C.
3. A piece of copper of mass 6.22 kg is heated from 20.5 degrees C to 324.3 degrees C. Calculate the heat absorbed by the metal.
4. A sheet of gold weighing 10.6 g and at a temperature of 18.0 degrees C is placed on a flat sheet of iron weighing 20.0 grams and at a temperature of 55.6 degrees C. What is the final temperature of the combined metals? Assume **NO** heat is lost to the surroundings.
5. Calculate the initial temperature of 50.0 grams of cold water when 85.5 grams of metallic iron at 99.8 degrees C is placed into it. The final temperature of the mixture is 22.3 degrees C. Assume no heat loss to the surroundings.
6. A certain mass of water was heated with 41.8 kJ, raising its temperature from 22.0 °C to 28.5 °C. Find the mass of water.

7. When 80.0 grams of a certain metal at 90.0 °C was mixed with 100.0 grams of water at 30.0

°C, the final equilibrium temperature of the mixture was 36.0 °C. What is the specific heat

of the metal?

1. 10.0 g of a fuel are burned under a calorimeter containing 200.0 g of H2O. The temperature of the water increases from 15.0 °C to 55.0 °C. Calculate the total heat produced (in joules) and the heat of combustion per gram of fuel.

9. When 12.29 g of finely divided brass (60% Cu, 40% Zn) at 95.0oC is quickly stirred into 40.00 g of water at 22.0oC in a calorimeter, the water temperature rises to 24.0oC. Find the specific heat of brass.

10. A 25.0 g piece of aluminum (which has a molar heat capacity of 24.03J/°C mol) is heated to 82.4°C and dropped into a calorimeter containing water (specific heat capacity of water is 4.18J/g°C) initially at 22.3°C. The final temperature of the water is 24.9°C. Calculate the mass of water in the calorimeter.